

CLAIMS

1. An electro-acoustic device for creating patterns of particulate matter, the device comprising a housing one  
5 end of which is closed and the other end of which is open, a diaphragm extending across the housing at or adjacent the open end of the housing to define and close a hollow interior to the housing, a mass of particulate matter located on the diaphragm, and, within the hollow interior  
10 of the housing, an electro-acoustic transducer, the arrangement being such that, in use with the diaphragm extending horizontally and on activation of the transducer by an audio signal, the acoustic output therefrom excites the diaphragm and creates a pattern in the particulate  
15 matter thereon indicative of the audio signal.

2. A device as claimed in claim 1 in which the upper end of the housing is closed by a transparent window overlying the diaphragm and through which the patterns in the particulate matter can be viewed.

20 3. A device as claimed in claim 2 in which the housing is mounted in an outer enclosure.

4. A device as claimed in claim 3 in which the volume of air between the housing and the outer enclosure is totally or partially evacuated.

25 5. A device as claimed in claim 4 in which elasticated suspension means react between the housing and

the outer enclosure to suspend the housing within the outer enclosure.

6. A device as claimed in any one of claims 1 to 5 in which the diaphragm comprises a tensioned sheet of elastic material extending across the housing.

7. A device as claimed in claim 6 in which the tension in the sheet is adjustable.

8. A device as claimed in claim 7, including tensioning means for tensioning and tuning the diaphragm.

9. A device as claimed in claim 8, wherein the tensioning means includes a plurality of tensioning devices spaced equally around the periphery of the diaphragm.

10. A device as claimed in any one of the preceding claims in which the particulate matter is sized to between 250 and 1000 microns.

11. A device as claimed in claim 10 in which the particulate matter is crushed quartz crystal.

12. A device as claimed in any one of the preceding claims in which the electro-acoustic transducer is a loudspeaker located coaxially within the housing with its acoustic output directed towards the underside of the diaphragm.

13. A device as claimed in any one of claims 1 to 11 in which the housing incorporates a waveguide arranged to allow the acoustic output from the electro-acoustic transducer to be incident upon the upper or lower surface of the diaphragm.

14. A device as claimed in claim 13 and further comprising means for projecting the patterns in the particulate matter onto a viewing panel external of the housing.

5 15. A device as claimed in claim 14 in which the means for projecting the pattern comprise a source of light within the hollow interior of the housing, a flat fresnel lens below the diaphragm, and a focusing lens above the diaphragm, the diaphragm being transparent.

10 16. A device as claimed in any one of claims 1 to 12 and including a video camera located above the diaphragm and arranged to transmit signals to a remote viewing location whereby the patterns in the particulate matter can be viewed at said location.

15 17. A device as claimed in any one of the preceding claims including means whereby moving images of modal patterns, representative of a recorded sound track, may be viewed in synchronism with the sound track.

20 18. A device as claimed in any one of claims 1 to 16 and including means whereby individual computer-stored modal patterns, may be accessed from memory in real time and viewed as moving modal patterns, on a visual display, representative of and in synchronism with the sound track.

25 19. A device as claimed in any one of claims 1 to 16 and including means whereby moving images of computer-stored modal patterns, representative of a live sound

performance, may be viewed in real time, during progress of the performance.

20. A method of tuning an electro-acoustic device according to any one of the previous claims, which method  
5 includes the steps of applying a tuning audio signal to the diaphragm, and adjusting the tensioning means so that the pattern formed on the diaphragm matches a predetermined tuning pattern associated with the tuning audio signal.